BookletChart™

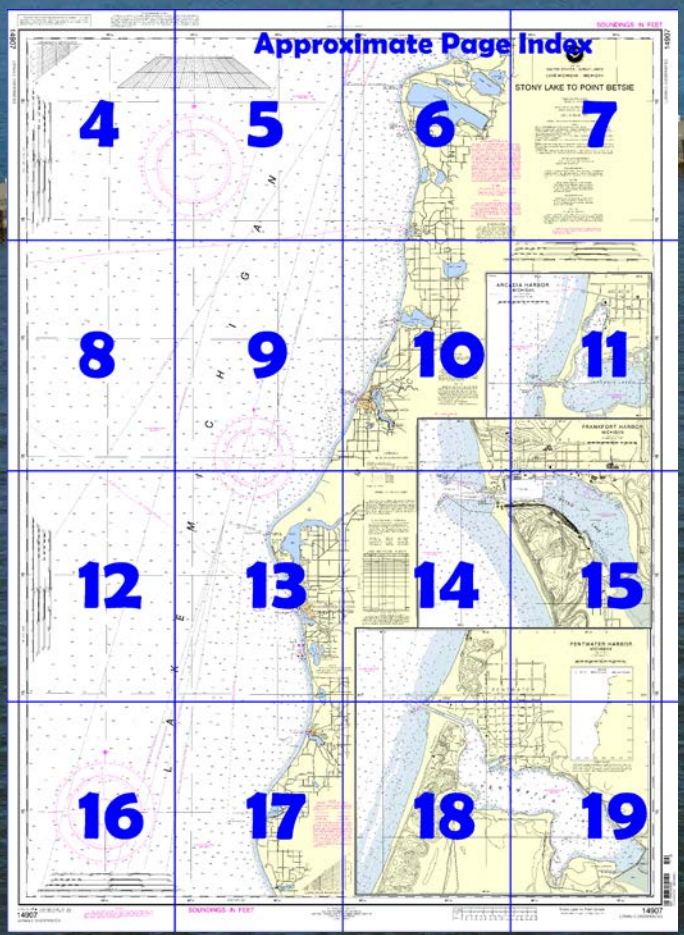
Stony Lake to Point Betsie

NOAA Chart 14907

A reduced-scale NOAA nautical chart for small boaters

When possible, use the full-size NOAA chart for navigation.

- *Complete, reduced-scale nautical chart*
- *Print at home for free*
- *Convenient size*
- *Up-to-date with Notices to Mariners*
- *Compiled by NOAA's Office of Coast Survey, the nation's chartmaker*



Published by the
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Coast Survey
www.NauticalCharts.NOAA.gov
888-990-NOAA

What are Nautical Charts?

Nautical charts are a fundamental tool of marine navigation. They show water depths, obstructions, buoys, other aids to navigation, and much more. The information is shown in a way that promotes safe and efficient navigation. Chart carriage is mandatory on the commercial ships that carry America's commerce. They are also used on every Navy and Coast Guard ship, fishing and passenger vessels, and are widely carried by recreational boaters.

What is a BookletChart™?

This BookletChart is made to help recreational boaters locate themselves on the water. It has been reduced in scale for convenience, but otherwise contains all the information of the full-scale nautical chart. The bar scales have also been reduced, and are accurate when used to measure distances in this BookletChart. See the Note at the bottom of page 5 for the reduction in scale applied to this chart.

Whenever possible, use the official, full scale NOAA nautical chart for navigation. Nautical chart sales agents are listed on the Internet at http://www.NauticalCharts.NOAA.gov.

This BookletChart does NOT fulfill chart carriage requirements for regulated commercial vessels under Titles 33 and 44 of the Code of Federal Regulations.

Notice to Mariners Correction Status

This BookletChart has been updated for chart corrections published in the U.S. Coast Guard Local Notice to Mariners, the National Geospatial Intelligence Agency Weekly Notice to Mariners, and, where applicable, the Canadian Coast Guard Notice to Mariners. Additional chart corrections have been made by NOAA in advance of their publication in a Notice to Mariners. The last Notices to Mariners applied to this chart are listed in the Note at the bottom of page 7. Coast Pilot excerpts are not being corrected.

For latest Coast Pilot excerpt visit the Office of Coast Survey website at http://www.nauticalcharts.noaa.gov/nsd/searchbychart.php?chart=14907.

(Selected Excerpts from Coast Pilot)
From Platte River Point southwest for 5.7 miles to Point Betsie, the shore is bold and hilly, and there are no outlying obstructions. **Point Betsie** is a rounding sandy point. **Point Betsie Light** (44°41.5'N., 86°15.3'W.), 52 feet above the water, is shown from a white cylindrical tower with a red roof and attached dwelling on the point. The light marks the turning point for vessels bound between Manitou Passage and the south end of Lake Michigan.
From Point Betsie, the shore continues sandy and hilly for 4.3 miles S to Frankfort Harbor.

Frankfort Harbor, 4.3 miles south of Point Betsie, is in Betsie Lake, connected to Lake Michigan by an entrance channel. The shore south of the entrance channel is bluff, reaching over 300 feet above the lake. The city of **Frankfort, MI,** is on the north side of Betsie Lake. A tank on a hill 0.75 mile northeast of the harbor entrance is prominent from Lake Michigan.
Frankfort North Breakwater Light (44°37'51"N., 86°15'08"W.), 72 feet above the water, is shown from a white square pyramidal tower on the north side of the harbor entrance. A sound signal, which operates by keying the microphone five times on VHF-FM channel 79, is at the light. An aerolight is 2.1 miles northeast of the light.
Channels.–The harbor is entered from Lake Michigan through a dredged entrance channel between converging breakwaters to an outer harbor basin which is not adapted for anchorage but reduces wave action in the inner harbor. From the outer basin, the channel continues east between parallel piers to an inner basin and anchorage area in Betsie Lake. (See Notice to Mariners and the latest edition of the chart for controlling depths.) The outer ends of the breakwaters and piers and marked by lights.
Betsie Lake, extends about 1.5 miles southeast from the inner end of the entrance channel. Outside the dredged areas, the lake is generally shoal, with depths of 8 feet and less. The southeast end of the lake is filled with submerged pilings, and at the extreme end, off the mouth of **Betsie River,** the lake is swampy. Anchorage in the lake is poor. A private channel extends from the inner harbor basin E through Betsie Lake to a private dock.
Bridges.– Betsie River is crossed near its mouth by a fixed highway bridge with a clearance of 4 feet and by a fixed railroad bridge with a 14-foot span and a clearance of 7 feet.
Currents.–Currents in the Frankfort Harbor entrance channel attain velocities up to 3 mph in either direction.
Frankfort Coast Guard Station is on the north side of the harbor entrance channel.
Harbor regulations.–A **speed limit** of 8 mph is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Mooring to the breakwaters, piers, or revetments is prohibited.
A **special anchorage** area, marked by private buoys, is in Betsie Lake.
Wharves.–Koch Fuels, Inc., receives petroleum products at a 425-foot wharf on the south side of the inner basin. The wharf has a deck height of 8 feet with reported depths of 18 to 20 feet alongside. There is tank storage for 310,000 barrels of petroleum.
Small-craft facilities.–A public dock constructed by the Michigan State Waterways Commission on the north side of the inner basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. A marine railway for small craft is available in the harbor.
Arcadia Lake, 10 miles south of Frankfort, is an L-shaped lake separated from Lake Michigan by a narrow strip of land. The lake is entered from deep water in Lake Michigan through a dredged entrance channel between parallel piers and revetments to deep water inside the lake; the pierheads are marked by lights. In 2011, the controlling depth was 8 feet (except for lesser depths to 6½ feet along the edges), in the entrance channel to the lake. The entrance channel is subject to extensive shoaling. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

U.S. Coast Guard Rescue Coordination Center
24 hour Regional Contact for Emergencies

RCC Cleveland	Commander 9th CG District Cleveland, OH	(216) 902-6117

Table of Selected Chart Notes

Scale 1:10,000
SOUNDINGS IN FEET

Scale 1:10,000
SOUNDINGS IN FEET

Scale 1:10,000
SOUNDINGS IN FEET

Ⓟ Pump-out facilities

CAUTION

Numerous uncharted private buoys have been established around the breakwall to mark the dangerous area.

WARNING

The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

CAUTION

Temporary changes or defects in aids to navigation are not indicated on this chart. See Local Notice to Mariners.

During some winter months or when endangered by ice, certain aids to navigation are replaced by other types or removed. For details see U.S. Coast Guard Light List.

CAUTION

Improved channels shown by broken lines are subject to shoaling, particularly at the edges.

CAUTION

SUBMARINE PIPELINES AND CABLES

Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:

Pipeline Area

Cable Area

Additional uncharted submarine pipelines and submarine cables may exist within the area of this chart. Not all submarine pipelines and submarine cables are required to be buried, and those that were originally buried may have become exposed. Mariners should use extreme caution when operating vessels in depths of water comparable to their draft in areas where pipelines and cables may exist, and when anchoring, dragging, or trawling.

Covered wells may be marked by lighted or unlighted buoys.

Polyconic Projection
Scale 1:120,000

North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS IN FEET

NOAA WEATHER RADIO BROADCASTS

The NOAA Weather Radio stations listed below provide continuous weather broadcasts. The reception range is typically 20 to 40 nautical miles from the antenna site, but can be as much as 100 nautical miles for stations at high elevations.

Hesperia, MI	WWF-36	162.475 MHz
Sister Bay, WI	WXN-69	162.425 MHz
Traverse City, MI	KIH-22	162.400 MHz
Sheboygan, WI	WWG-91	162.425 MHz

CAUTION

Due to periodic high water conditions in the Great Lakes, some features charted as visible at Low Water Datum may be submerged, particularly in the near shore areas. Mariners should proceed with caution.

RADAR REFLECTORS

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

HORIZONTAL DATUM

The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1902 must be corrected an average of 0.352" southward and 0.684" westward to agree with this chart.

CAUTION

Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial-Intelligence Agency Publication 117.

Radio direction-finder bearings to commercial broadcasting stations are subject to error and should be used with caution.

Station positions are shown thus:
⊙(Accurate location) ○(Approximate location)

Low Water Datum, which is the plane of reference for the levels shown on the above hydrograph, is also the plane of reference for the charted depths. If the lake level is above or below Low Water Datum, the existing depths are correspondingly greater or lesser than the charted depths.

LORAN-C

GENERAL EXPLANATION

LORAN-C FREQUENCY.....100kHz
PULSE REPETITION INTERVAL
8970.....89,700 Microseconds
STATION TYPE DESIGNATORS: (Not individual station letter designators).
M..... Master
W..... Secondary
X..... Secondary
Y..... Secondary
Z..... Secondary

EXAMPLE: 8970-X

RATES ON THIS CHART

8970-X 8970-Y

Loran-C correction tables published by the National Geospatial-Intelligence Agency or others should not be used with this chart. The lines of position shown have been adjusted based on survey data. Every effort has been made to meet the ¼ nautical mile accuracy criteria established by the U.S. Coast Guard. Mariners are cautioned not to rely solely on the lattices in inshore waters.

NOTE A

Navigation regulations are published in Chapter 2, U.S. Coast Pilot 6. Additions or revisions to Chapter 2 are published in the Notice to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 9th Coast Guard District in Cleveland, Ohio or at the Office of the District Engineer, Corps of Engineers in Detroit, Michigan.

Refer to charted regulation section numbers.

Sailing courses and limits indicated in magenta are recommended by the Lake Carriers Association and the Canadian Shipowners Association.

POLLUTION REPORTS

Report all spills of oil and hazardous substances to the National Response Center via 1-800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

CAUTION

POTABLE WATER INTAKE

Vessels operating in fresh water lakes or rivers shall not discharge sewage, or ballast, or bilge water within such areas adjacent to domestic water intakes as are designated by the Commissioner of Food and Drugs (21 CFR 1250.93). Consult U.S. Coast Pilot 6 for important supplemental information.

SOURCE DIAGRAM

Most of the hydrography identified by the letter "j" was surveyed by the U.S. Army Corps of Engineers prior to 1974. Channels currently maintained by the U.S. Army Corps of Engineers are periodically resurveyed and are not shown on this diagram. Refer to Chapter 1, United States Coast Pilot.

AUTHORITIES. Hydrography and topography by the National Ocean Service, Coast Survey, with additional data from the Corps of Engineers, Geological Survey, and U.S. Coast Guard.

BRIDGE AND OVERHEAD CABLE CLEARANCES. When the water surface is above Low Water Datum, bridge and overhead clearances are reduced correspondingly. For clearances see U.S. Coast Pilot 6.

SAILING DIRECTIONS. Bearings of sailing courses are true and distances given thereon are in statute miles between points of departure.

AIDS TO NAVIGATION. Consult U.S. Coast Guard LIght List for supplemental information concerning aids to navigation.

PLANE OF REFERENCE OF THIS CHART (Low Water Datum).....577.5 ft.
Referred to mean water level at Rimouski, Quebec, International Great Lakes Datum (1985).

SYMBOLS AND ABBREVIATIONS. For complete list of symbols and abbreviations see Chart No. 1.

This nautical chart has been designed to promote safe navigation. The National Ocean Service encourages users to submit corrections, additions, or comments for improving this chart to the Chief, Marine Chart Division (N/CS2), National Ocean Service, NOAA, Silver Spring, Maryland 20910-3282.

PRINT-ON-DEMAND CHARTS

NOAA and its partner, OceanGrafix, offer this chart updated weekly by NOAA for Notices to Mariners and critical corrections. Charts are printed when ordered using Print-on-Demand technology. New Editions are available 5-8 weeks before their release as traditional NOAA charts. Ask your chart agent about Print-on-Demand charts or contact NOAA at 1-800-584-4683, http://NauticalCharts.gov, help@NauticalCharts.gov, or OceanGrafix at 1-877-56CHART, http://OceanGrafix.com, or help@OceanGrafix.com.

14907

LORAN-C OVERPRINTED

86°50'

86°40'

44° 40'

44° 30'

LORAN LINEAR INTERPOLATOR

MICROSECONDS

Latitude and Longitude Plotting Interpol

SCALE 1:120,000

Nautical Miles

Statute Miles

Yards

Meters

MAGNETIC

VAR 4° 45 W (2009)

ANNUAL INCREASE 4

8970-X 32150

32160

32170

32180

CONTINUED ON CHART 14910

Joins page 8

Printed at reduced scale.

See Note on page 5.

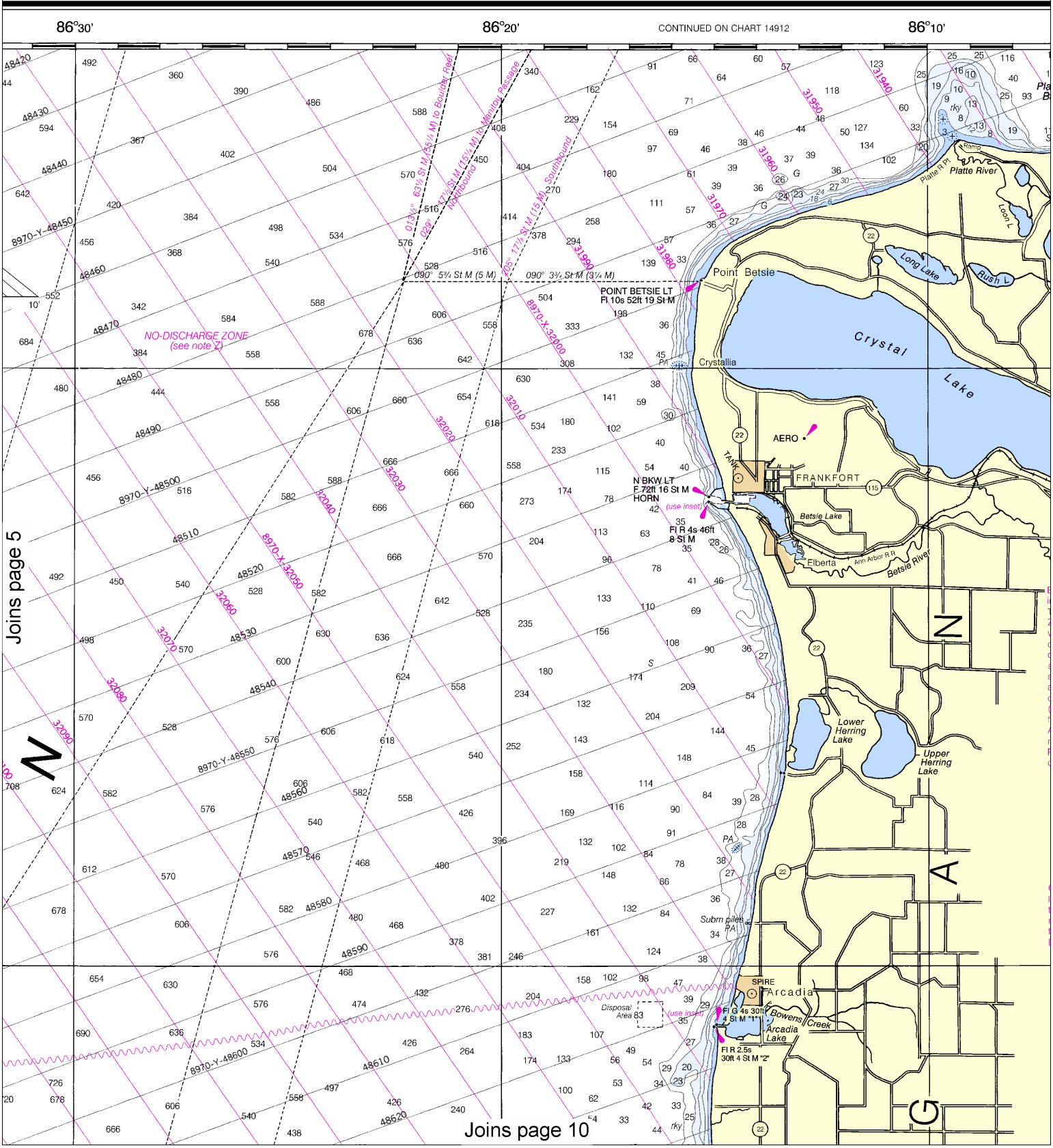
YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13

Note: Chart grid lines are aligned with true north.

This BookletChart was reduced to 75% of the original chart scale.
The new scale is 1:160000. Barscales have also been reduced and
are accurate when used to measure distances in this BookletChart.

Formerly LS 77, 1st Ed., Aug. 1913 KAPP 1379



Note: Chart grid lines are aligned with true north.

Printed at reduced scale.

YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13

See Note on page 5.

SOUNDINGS IN FEET

14907

LORAN-C OVERPRINTED

86°00'

85°50'

44° 40'

44° 30'

THE NATION'S CHARTMAKER SINCE 1807

UNITED STATES - GREAT LAKES

LAKE MICHIGAN - MICHIGAN

STONY LAKE TO POINT BETSIE

Polyconic Projection
Scale 1:120,000

North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS IN FEET

Additional information can be obtained at nauticalcharts.noaa.gov.

NOTES

PLANE OF REFERENCE OF THIS CHART (Low Water Datum).....577.5 ft.
Referred to mean water level at Rimouski, Quebec, International Great Lakes Datum (1985).
SAILING DIRECTIONS. Bearings of sailing courses are true and distances given thereon are in statute miles between points of departure.
AIDS TO NAVIGATION. Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.
SYMBOLS AND ABBREVIATIONS. For complete list of symbols and abbreviations see Chart No. 1.
BRIDGE AND OVERHEAD CABLE CLEARANCES. When the water surface is above Low Water Datum, bridge and overhead clearances are reduced correspondingly. For clearances see U.S. Coast Pilot 6.
AUTHORITIES. Hydrography and topography by the National Ocean Service, Coast Survey, with additional data from the Corps of Engineers, Geological Survey, and U.S. Coast Guard.

SUPPLEMENTAL INFORMATION

Consult U.S. Coast Pilot 6 for important supplemental information.

POLLUTION REPORTS

Report all spills of oil and hazardous substances to the National Response Center via 1-800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

CAUTION

Due to periodic high water conditions in the Great Lakes, some features charted as visible at Low Water Datum may be submerged, particularly in the near shore areas. Mariners should proceed with caution.

RADAR REFLECTORS

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

CAUTION

POTABLE WATER INTAKE

Vessels operating in fresh water lakes or rivers shall not discharge sewage, or ballast, or bilge water within such areas adjacent to domestic water intakes as are designated by the Commissioner of Food and Drugs (21 CFR 1250.93). Consult U.S. Coast Pilot 6 for important supplemental information.

Sailing courses and limits indicated in magenta are recommended by the Lake Carriers Association and the Canadian Shipowners Association.

NOTE Z

NO-DISCHARGE ZONE, 40 CFR 140

Michigan waters of Lakes Michigan, Huron, Superior, Erie and St. Clair, all waterways connected thereto, and all inland lakes are designated as a No-Discharge Zone (NDZ). This chart falls entirely within the limits of a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. Commercial vessel sewage shall include graywater. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

WARNING

The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

NOTE A

Navigation regulations are published in Chapter 2, U.S. Coast Pilot 6. Additions or revisions to Chapter 2 are published in the Notice to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 9th Coast Guard District in Cleveland, Ohio or at the Office of the District Engineer, Corps of Engineers in Detroit, Michigan.
Refer to charted regulation section numbers.

HORIZONTAL DATUM

The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1902 must be corrected an average of 0.352" southward and 0.684" westward to agree with this chart.

SCALE 1:120,000

Nautical Miles

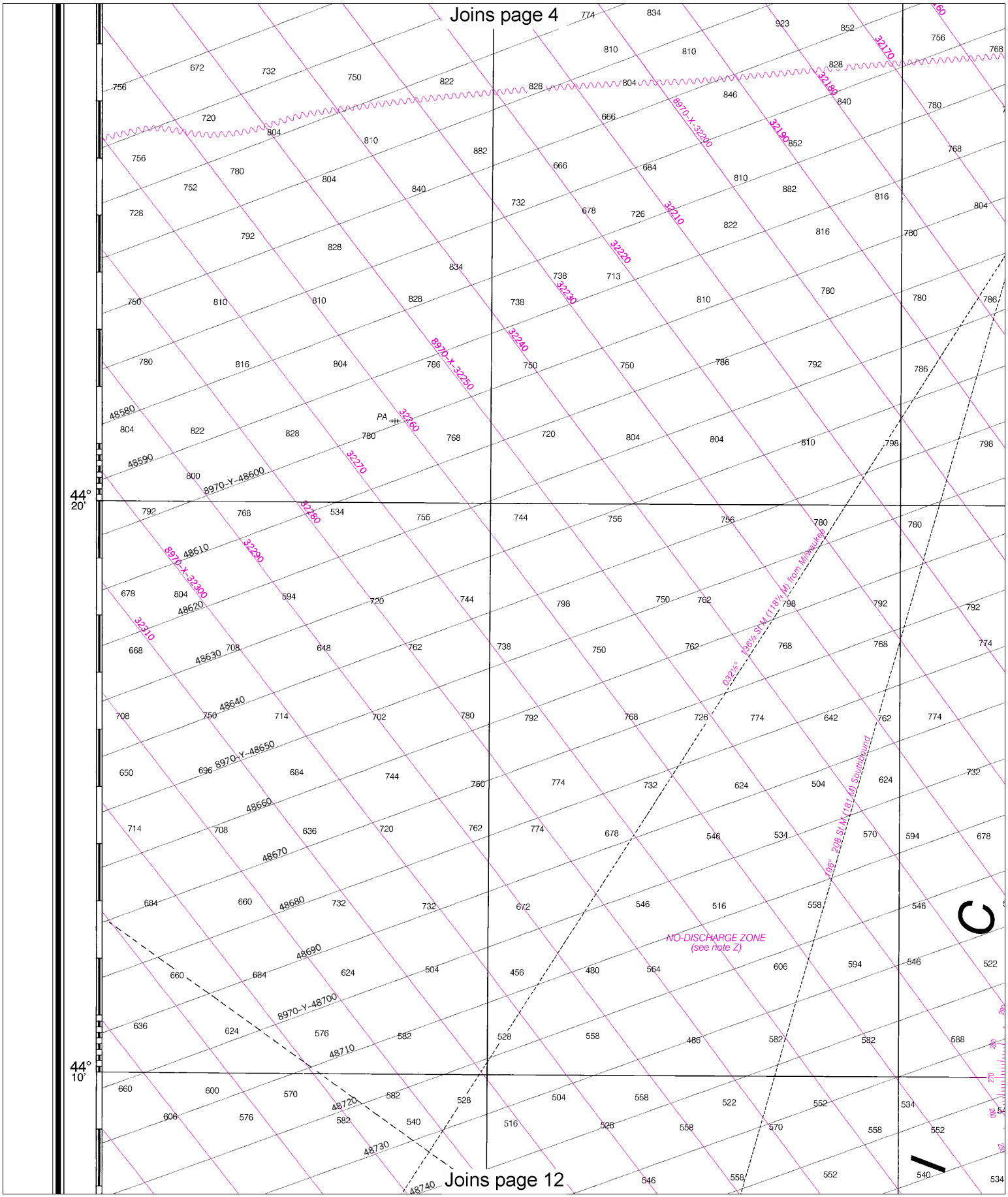
1 0 1 2 3 4 5 6 7 8 9

Statute Miles

1 0 1 2 6 7 8 9

Joins page 11

This BookletChart has been updated through: Coast Guard Local Notice To Mariners: 4712 11/20/2012,
NGA Weekly Notice to Mariners: 4812 12/1/2012,
Canadian Coast Guard Notice to Mariners: 1012 10/26/2012.



8

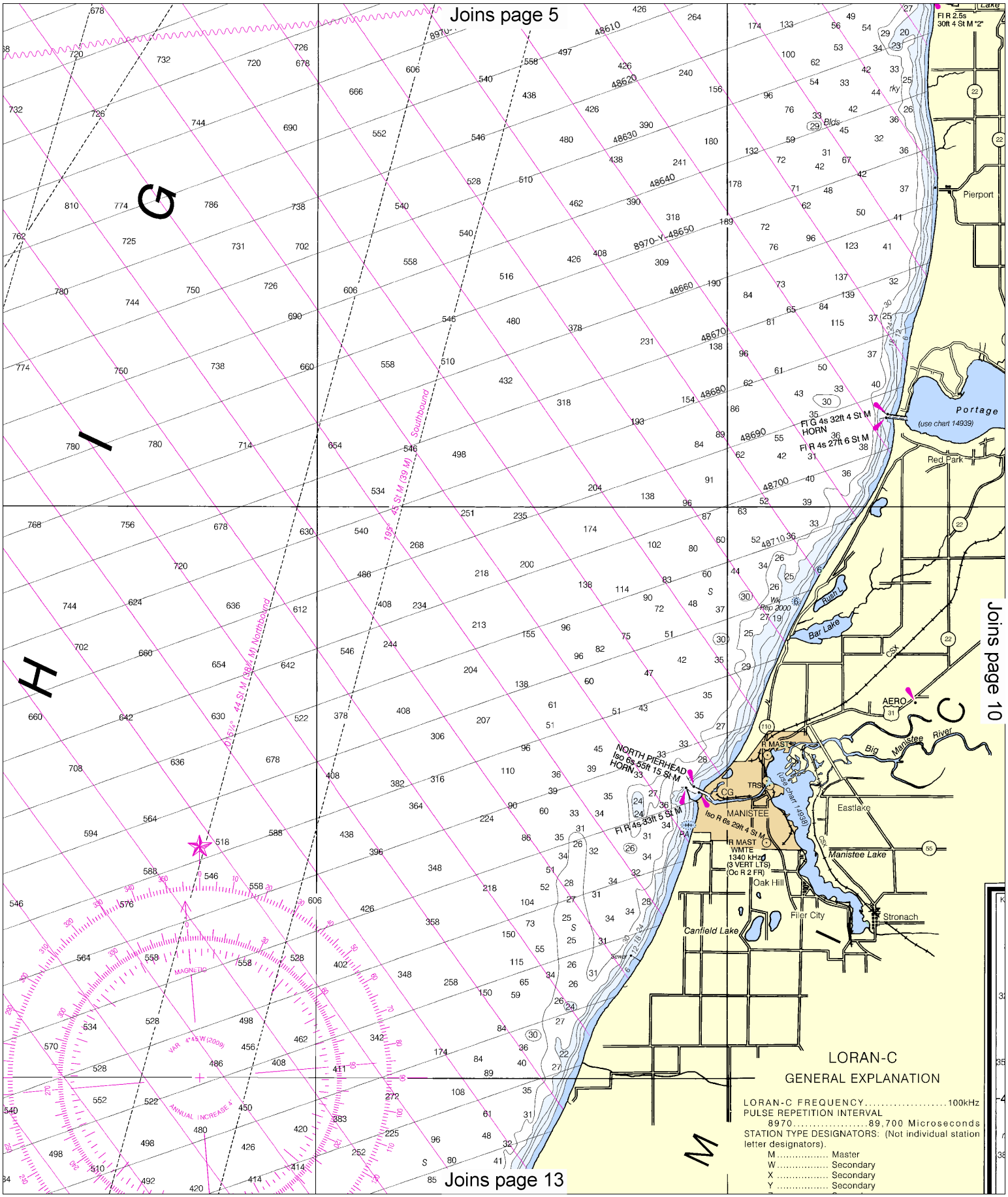
Note: Chart grid lines are aligned with true north.

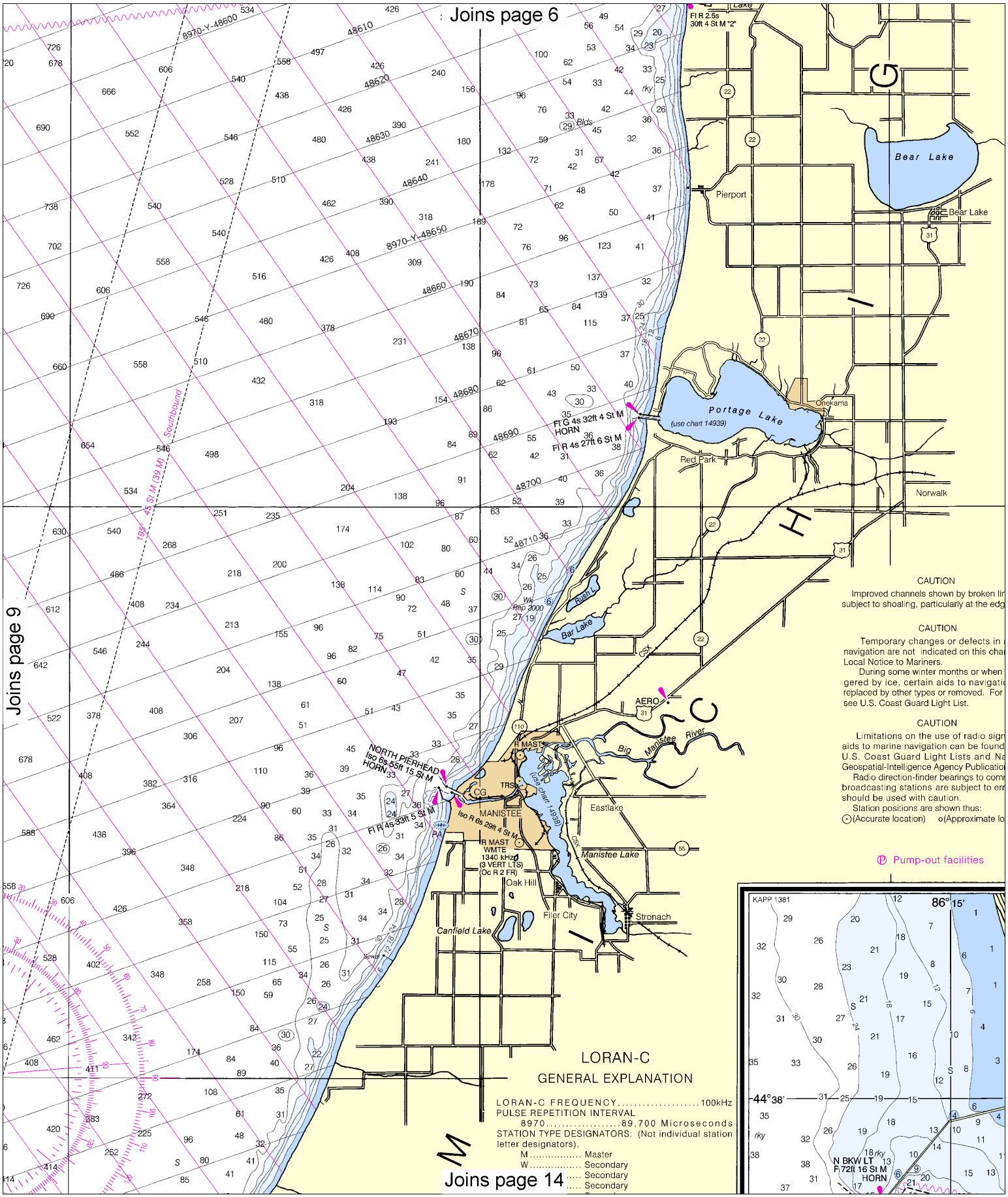
Printed at reduced scale.

See Note on page 5.

YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13


Joins page 5
Joins page 10
Joins page 13
Pierport
Portage
(use chart 14939)
Red Park
Bar Lake
Rush L
Eastlake
Manistee Lake
Oak Hill
Filer City
Stronach
Canfield Lake
MANISTEE
Big Manistee River
AERO
CG
TRS
R MAST
NORTH PIERHEAD
Iso 6s 55ft 15 St M
HORN
Fl R 4s 35ft 5 St M
Iso R 6s 29ft 4 St M
Fl G 4s 32ft 4 St M
HORN
Fl R 4s 27ft 6 St M
Fl R 2.5s
30ft 4 St M "2"
R MAST
WMTE
1340 kHz
(3 VERT LTS)
(Oc R 2 FR)
Southbound
195° 45 St M (39 M)
015½° 44 St M (38¾ M) Northbound
MAGNETIC
VAR 4°45 W (2009)
ANNUAL INCREASE 4'
LORAN-C
GENERAL EXPLANATION
LORAN-C FREQUENCY.....100kHz
PULSE REPETITION INTERVAL
8970.....89,700 Microseconds
STATION TYPE DESIGNATORS: (Not individual station letter designators).
M..... Master
W..... Secondary
X..... Secondary
Y..... Secondary



Note: Chart grid lines are aligned with true north.

Printed at reduced scale.

YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13

See Note on page 5.

Geographic positions referred to the North American Datum of 1902 must be corrected an average of 0.352" southward and 0.684" westward to agree with this chart.

Joins page 7

SCALE 1:120,000

Nautical Miles 1 0 1 2 3 4 5 6 7 8 9

Statute Miles 1 0 1 2 3 4 5 6 7 8 9

Yards 2000 0 2000 4000 6000 8000 10000 12000

Meters 2000 0 2000 4000 6000 8000 10000 12000

KAPP 2935

ARCADIA HARBOR
MICHIGAN

Scale 1:10,000

SOUNDINGS IN FEET

½ Nautical Miles 0 ½

Yards 200 0 200 400 600 800 1000

86°15' 86°14' 44°29'

ARCADIA

Oak St

PO

Lake St

Arcadia Marina

Ramp

Mill St

SPIRE (FLOODLIGHTED)

Ruins

Ramp

Pine St

State Dock

Subm piles

NO-DISCHARGE ZONE (see note Z)

Fl G 4s 30ft 4 St M "1"

Fl R 2.5s 30ft 4 St M "2"

7 FT JUL 2012

Bowens Creek

Grass

Wd

ARCADIA LAKE

Grs

44° 20'

44° 10'

lines are dges.

h aids to hart. See

n endan- tion are or details

gnals as nd in the National ion 117. mmercial error and

location)

Joins page 15

FRANKFORT HARBOR
MICHIGAN

Scale 1:10,000

SOUNDINGS IN FEET

½ Nautical Miles

Yards 200 0 200 400 600 800 1000

FRANKFORT

Park Ave

Hospital

TANK

Crystal Ave

James St

STACK

Leelanau Ave

Forest Ave

Main

SPIRE (FLOODLIGHTED)

Jacobson Marina

Luedtke Engineering Co

Nelson's Marine Service

Post Office

City Hall

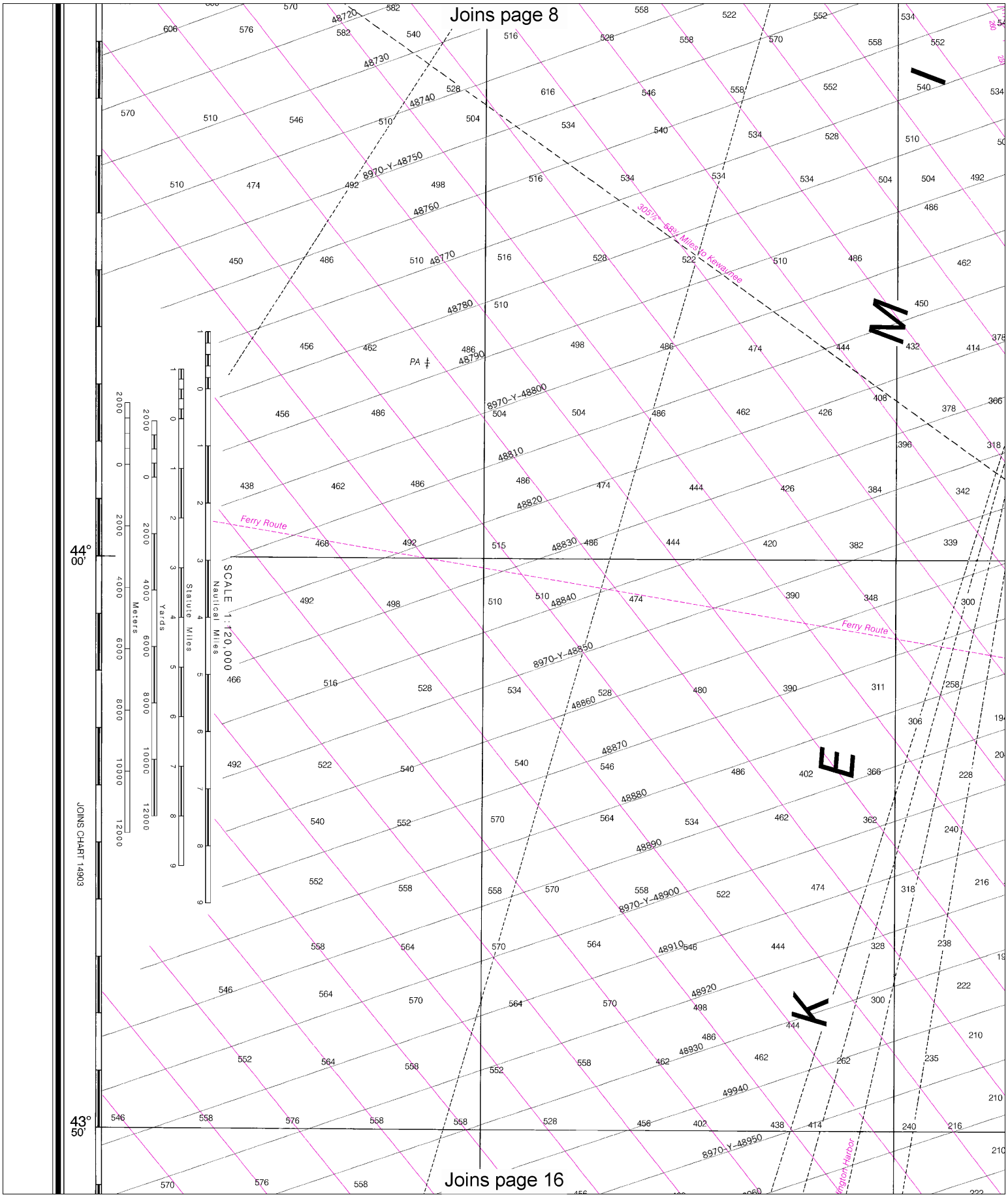
Library

Wastewater Treatment

Production Industries, Inc

Pet, Inc Frozen Foods Div

44°38'



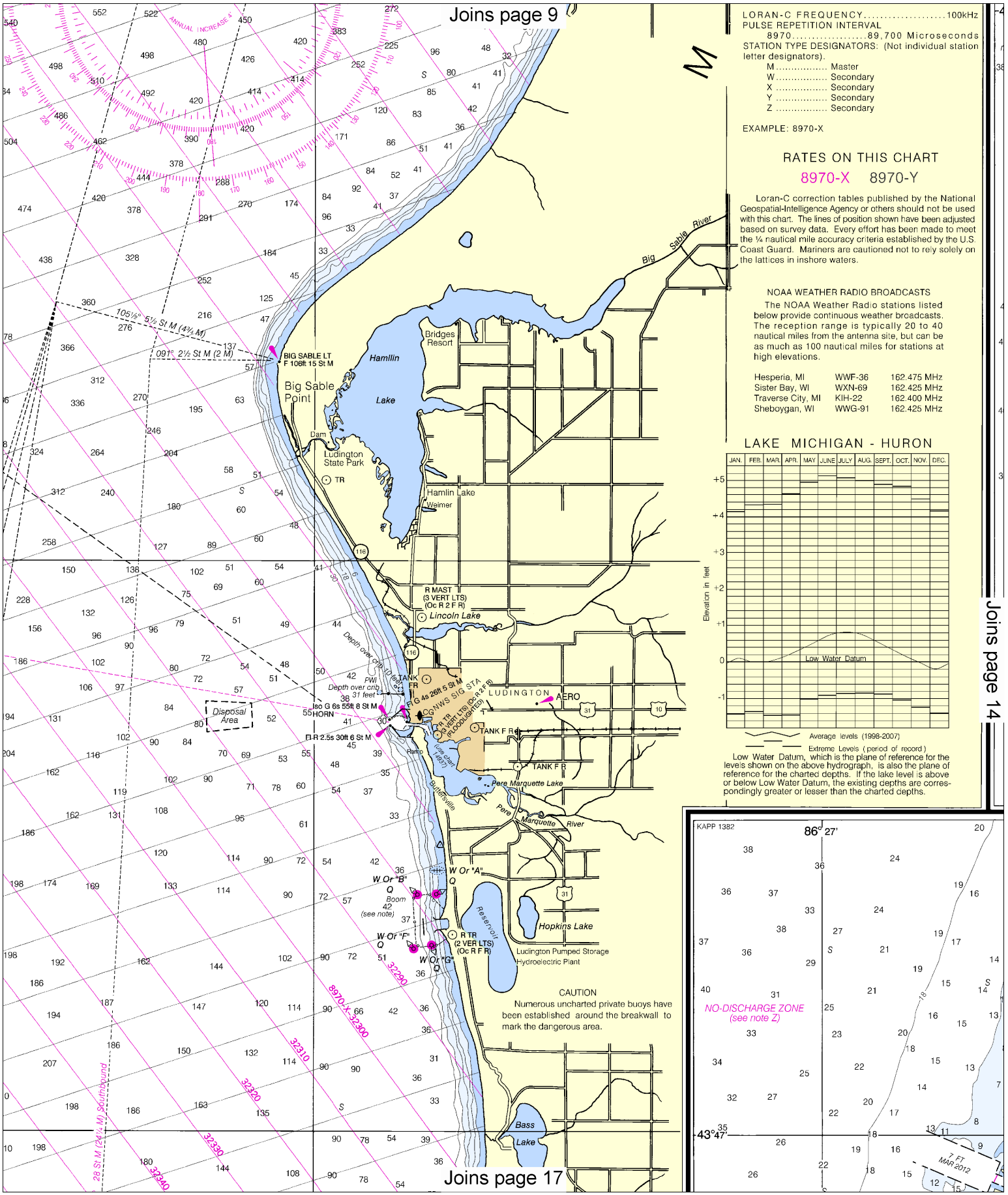
Note: Chart grid lines are aligned with true north.

Printed at reduced scale.

See Note on page 5.

YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13


Joins page 9
LORAN-C FREQUENCY.....100kHz
PULSE REPETITION INTERVAL
8970.....89,700 Microseconds
STATION TYPE DESIGNATORS: (Not individual station letter designators).
M..... Master
W..... Secondary
X..... Secondary
Y..... Secondary
Z..... Secondary
EXAMPLE: 8970-X
RATES ON THIS CHART
8970-X 8970-Y
Loran-C correction tables published by the National Geospatial-Intelligence Agency or others should not be used with this chart. The lines of position shown have been adjusted based on survey data. Every effort has been made to meet the ¼ nautical mile accuracy criteria established by the U.S. Coast Guard. Mariners are cautioned not to rely solely on the lattices in inshore waters.
NOAA WEATHER RADIO BROADCASTS
The NOAA Weather Radio stations listed below provide continuous weather broadcasts. The reception range is typically 20 to 40 nautical miles from the antenna site, but can be as much as 100 nautical miles for stations at high elevations.
Hesperia, MI WWF-36 162.475 MHz
Sister Bay, WI WXN-69 162.425 MHz
Traverse City, MI KIH-22 162.400 MHz
Sheboygan, WI WWG-91 162.425 MHz
LAKE MICHIGAN - HURON
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
+5 +4 +3 +2 +1 0 -1
Elevation in feet
Low Water Datum
Average levels (1998-2007)
Extreme Levels (period of record)
Low Water Datum, which is the plane of reference for the levels shown on the above hydrograph, is also the plane of reference for the charted depths. If the lake level is above or below Low Water Datum, the existing depths are correspondingly greater or lesser than the charted depths.
Big Sable River
Bridges Resort
Hamlin Lake
Big Sable Point
Ludington State Park
Dam
TR
Hamlin Lake Weimer
BIG SABLE LT F 106ft 15 St M
105½° 5½ St M (4¾ M)
091° 2½ St M (2 M)
R MAST (3 VERT LTS) (Oc R 2 F R)
Lincoln Lake
Depth over crib 10 feet
PWI Depth over crib 31 feet
TANK FR
Fl G 4s 26ft 5 St M
LGG NWS SIG STA
LUDINGTON AERO
Iso G 6s 55ft 8 St M HORN
Disposal Area
Fl R 2.5s 30ft 6 St M
R TR (3 VERT LTS) (OCR 2 F R) (FLOODLIGHTED)
TANK F R
Ramp
Loss Point (1837)
TANK F R
Pere Marquette Lake
Butterfield
Pere Marquette River
W Or "A" Q
W Or "B" Q
Boom 42 (see note)
W Or "F" Q
W Or "G" Q
R TR (2 VER LTS) (Oc R F R)
Reservoir
Hopkins Lake
Ludington Pumped Storage Hydroelectric Plant
CAUTION
Numerous uncharted private buoys have been established around the breakwall to mark the dangerous area.
8970-X 32300
32290
32310
32320
32330
32340
28 St M (24¼ M) Southbound
Bass Lake
Joins page 17
Joins page 14
KAPP 1382
86° 27'
NO-DISCHARGE ZONE (see note Z)
43°47'
7 FT MAR 2012

Joins page 10

EQUENCY.....100kHz
TION INTERVAL
8970.....89,700 Microseconds
STATION TYPE DESIGNATORS: (Not individual station letter designators).
M ..... Master
W ..... Secondary
X ..... Secondary
Y ..... Secondary
Z ..... Secondary

EXAMPLE: 8970-X

RATES ON THIS CHART

8970-X 8970-Y

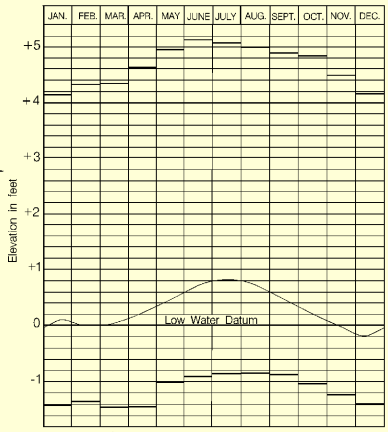
Loran-C correction tables published by the National Geospatial-Intelligence Agency or others should not be used with this chart. The lines of position shown have been adjusted based on survey data. Every effort has been made to meet the ¼ nautical mile accuracy criteria established by the U.S. Coast Guard. Mariners are cautioned not to rely solely on the lattices in inshore waters.

NOAA WEATHER RADIO BROADCASTS

The NOAA Weather Radio stations listed below provide continuous weather broadcasts. The reception range is typically 20 to 40 nautical miles from the antenna site, but can be as much as 100 nautical miles for stations at high elevations.

Hesperia, MI	WWF-36	162.475 MHz
Sister Bay, WI	WXN-69	162.425 MHz
Traverse City, MI	KIH-22	162.400 MHz
Sheboygan, WI	WWG-91	162.425 MHz

LAKE MICHIGAN - HURON



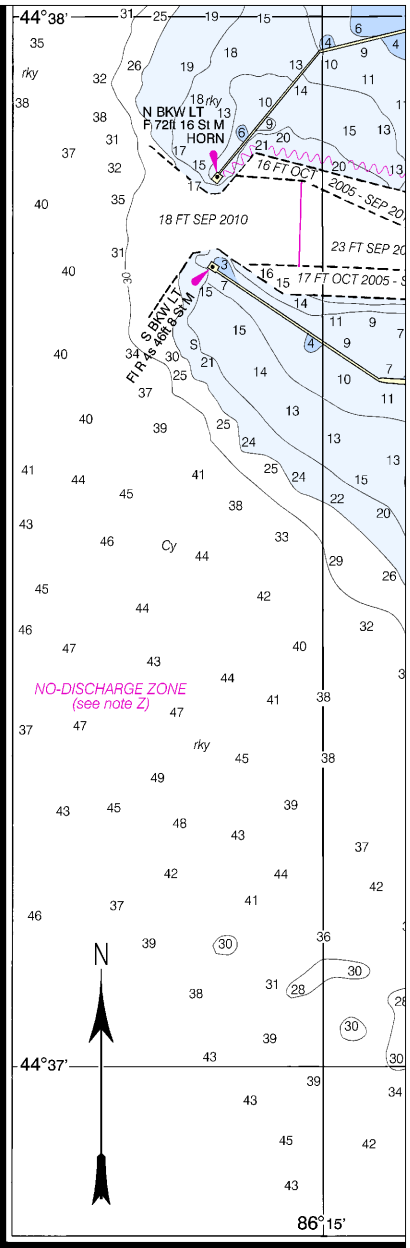
Low Water Datum, which is the plane of reference for the levels shown on the above hydrograph, is also the plane of reference for the charted depths. If the lake level is above or below Low Water Datum, the existing depths are correspondingly greater or lesser than the charted depths.

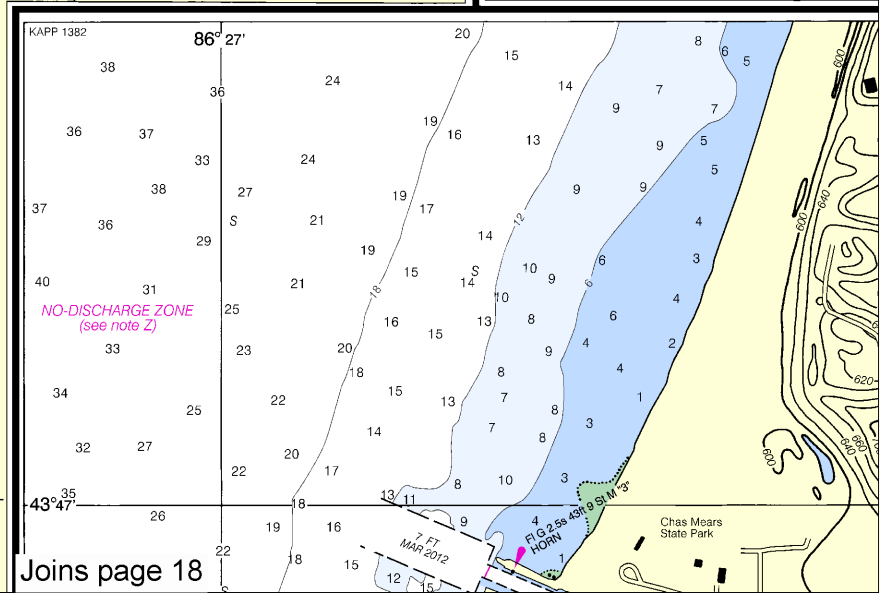
Joins page 13

BIG SABLE LT
F 106ft 15 St M
Big Sable Point
Hamlin Lake
Dam
Ludington State Park
TR
Bridges Resort
Big Sable River
Hamlin Lake
Weimer
R MAST (3 VERT LTS) (Oc R 2 F R)
Lincoln Lake
TANK FR
FIG 4s 26ft 5 St M
DGNWS SIG STA
LUDINGTON AERO
R TR (3 VERT LTS) (Oc R 2 F R) (FLOODLIGHTED)
TANK F R
Iso G 6s 55ft 8 St M HORN
Fl R 2.5s 30ft 6 St M
Ramp
Loss plant (1927)
TANK F R
Pere Marquette Lake
Butterfield
Pere Marquette River
W Or "A" Q
W Or "B" Q
Boom 42 (see note)
W Or "F" Q
W Or "G" Q
R TR (2 VER LTS) (Oc R F R)
Hopkins Lake
Reservoir
Ludington Pumped Storage Hydroelectric Plant
Depth over crib 10 feet
PWI
Depth over crib 31 feet
32290
8970-X 32300
32310

CAUTION
Numerous uncharted private buoys have been established around the breakwall to mark the dangerous area.

Bass Lake



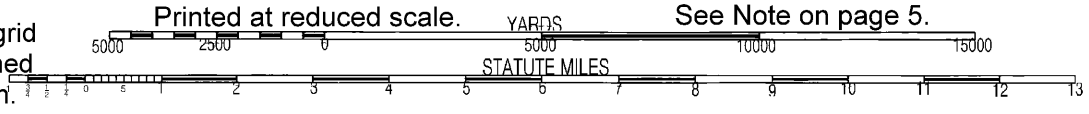


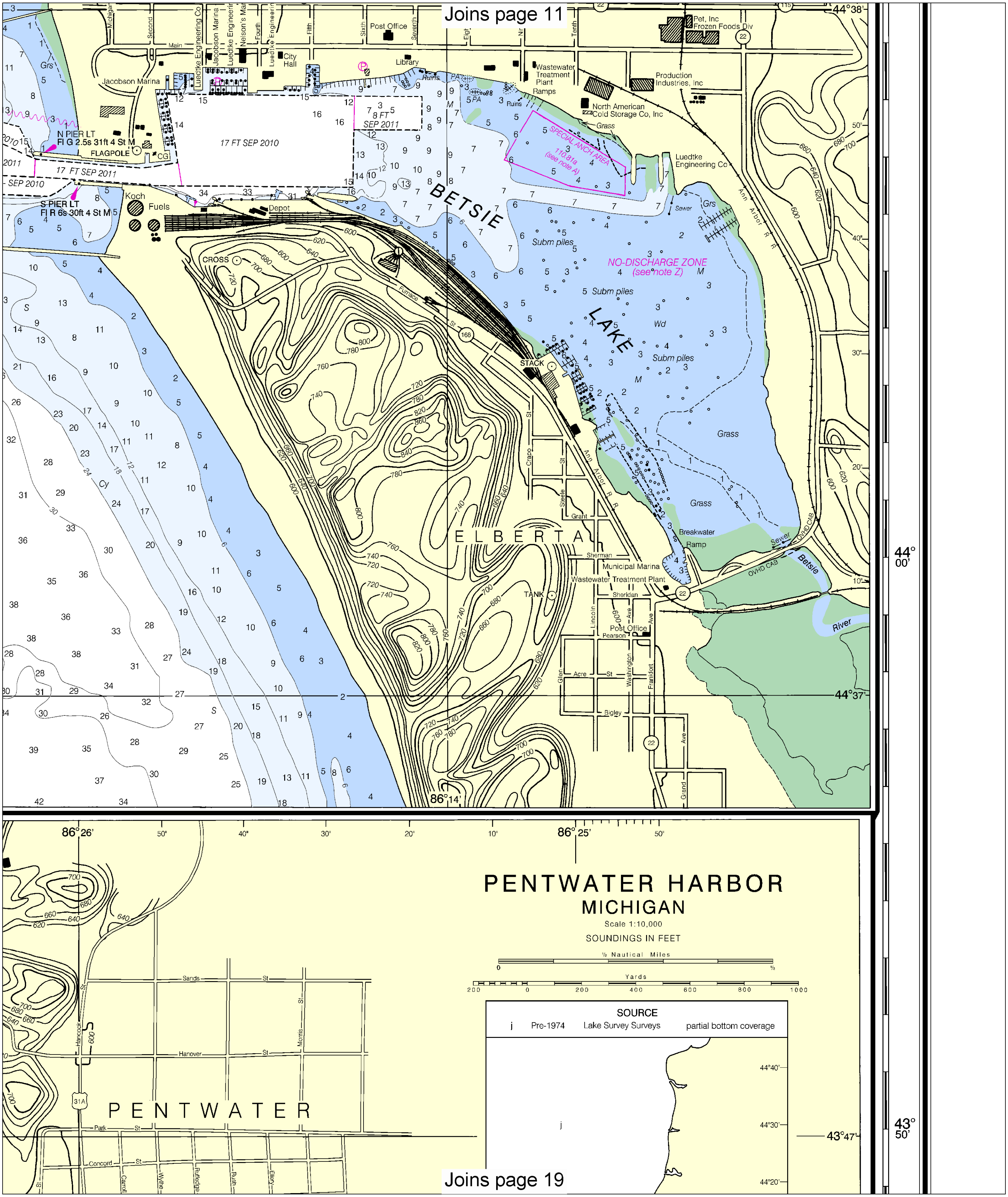
Joins page 18

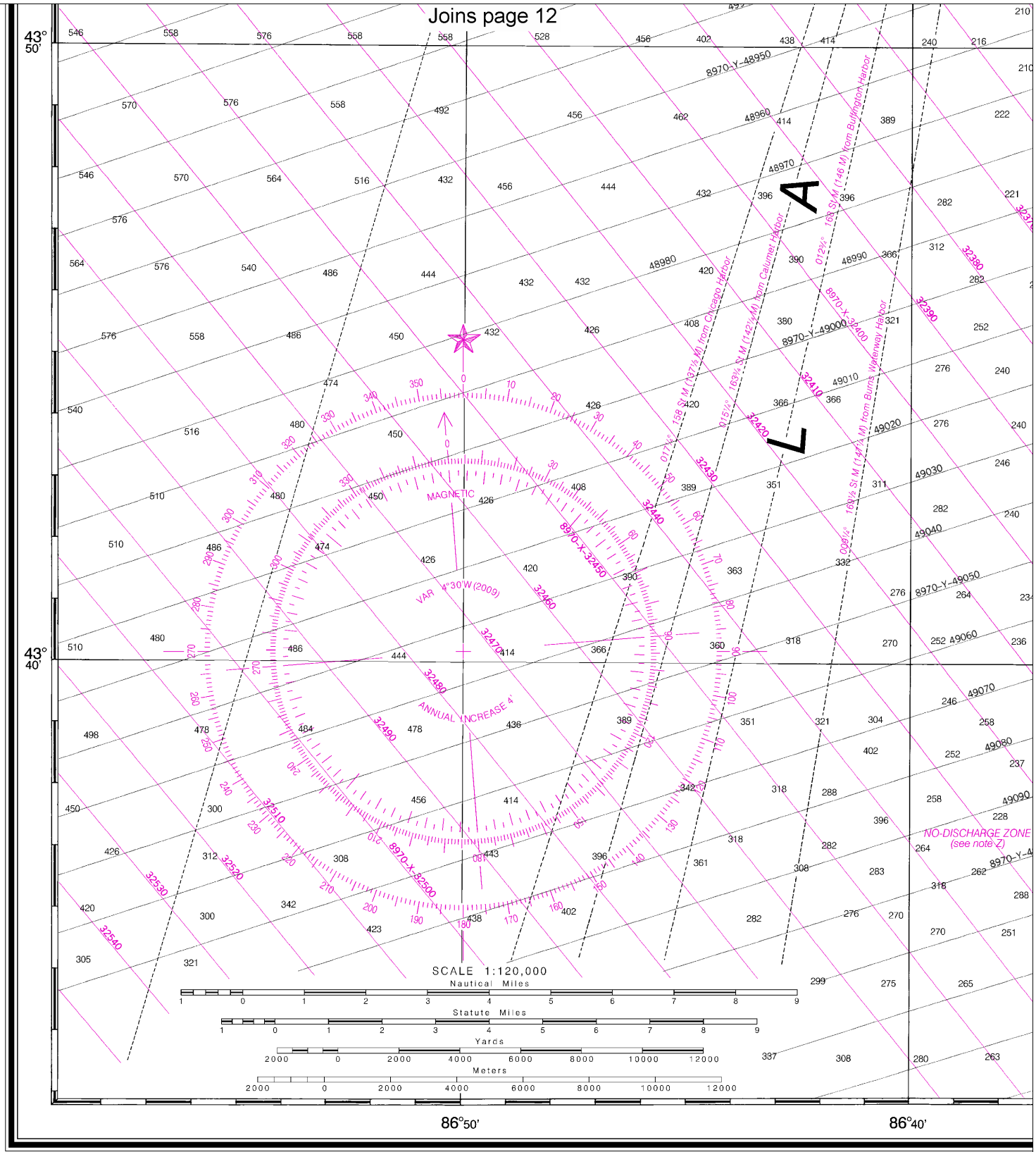
Note: Chart grid lines are aligned with true north.

Printed at reduced scale.

See Note on page 5.




Joins page 11
BETSIE LAKE
ELBERTA
NO-DISCHARGE ZONE (see note Z)
SPECIAL ANCH AREA 110.81a (see note A)
N PIER LT Fl G 2.5s 31ft 4 St M
S PIER LT Fl R 6s 30ft 4 St M
17 FT SEP 2010
8 FT SEP 2011
Jacobson Marina
Luedtke Engineering Co
City Hall
Post Office
Library
Wastewater Treatment Plant
North American Cold Storage Co, Inc
Production Industries, Inc
Pet, Inc Frozen Foods Div
Municipal Marina
Breakwater
Ramp
Betsie River
44°38'
44°37'
86°14'
PENTWATER HARBOR
MICHIGAN
Scale 1:10,000
SOUNDINGS IN FEET
SOURCE
j Pre-1974 Lake Survey Surveys partial bottom coverage
PENTWATER
43°47'
Joins page 19



27th Ed., Mar. / 09 ■ Corrected through NM Mar. 14/09
Corrected through LNM Mar. 03/09

14907

LORAN-C OVERPRINTED

CAUTION

This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

SOUNDIN

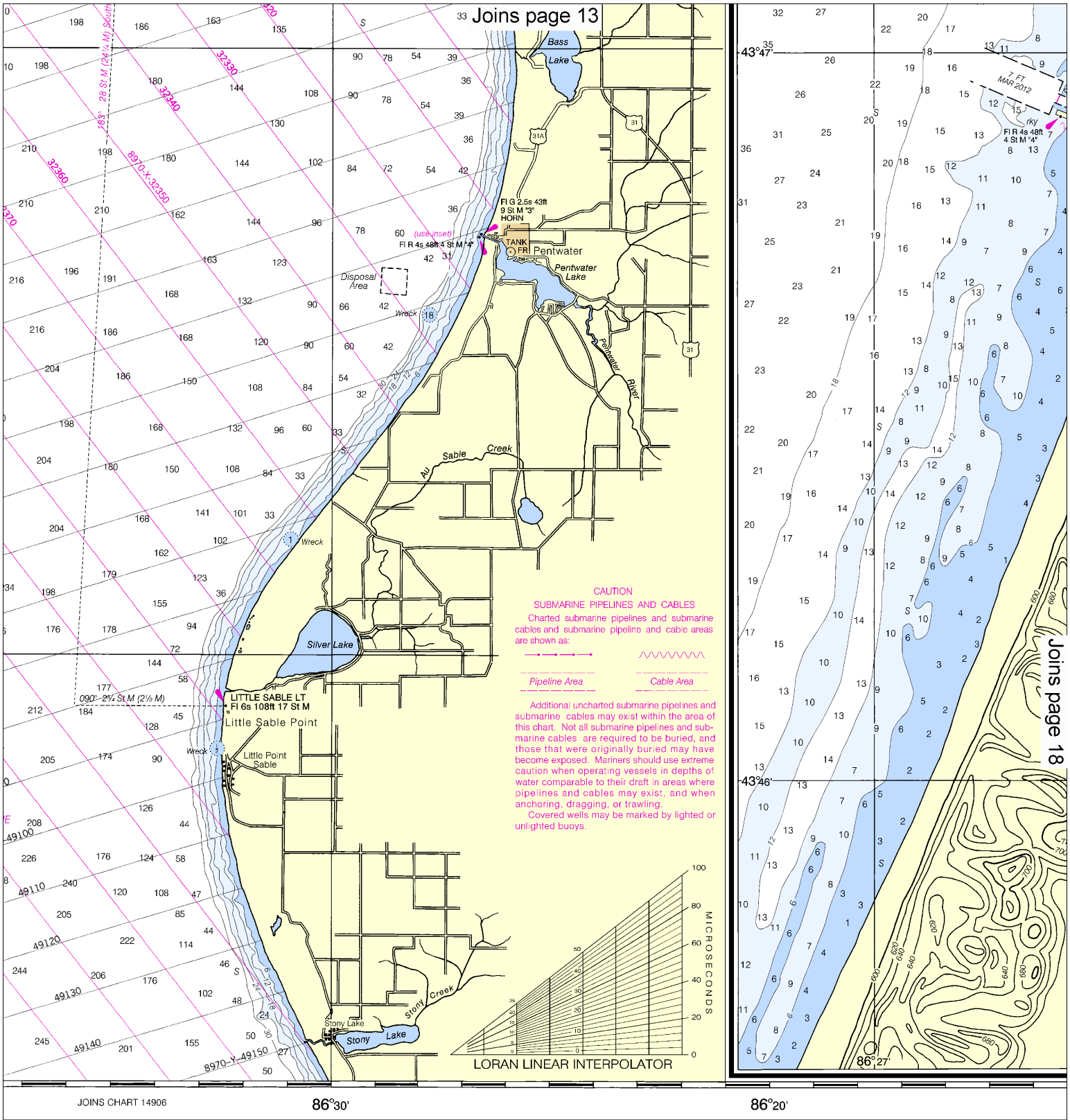
Note: Chart grid lines are aligned with true north.

Printed at reduced scale.

See Note on page 5.

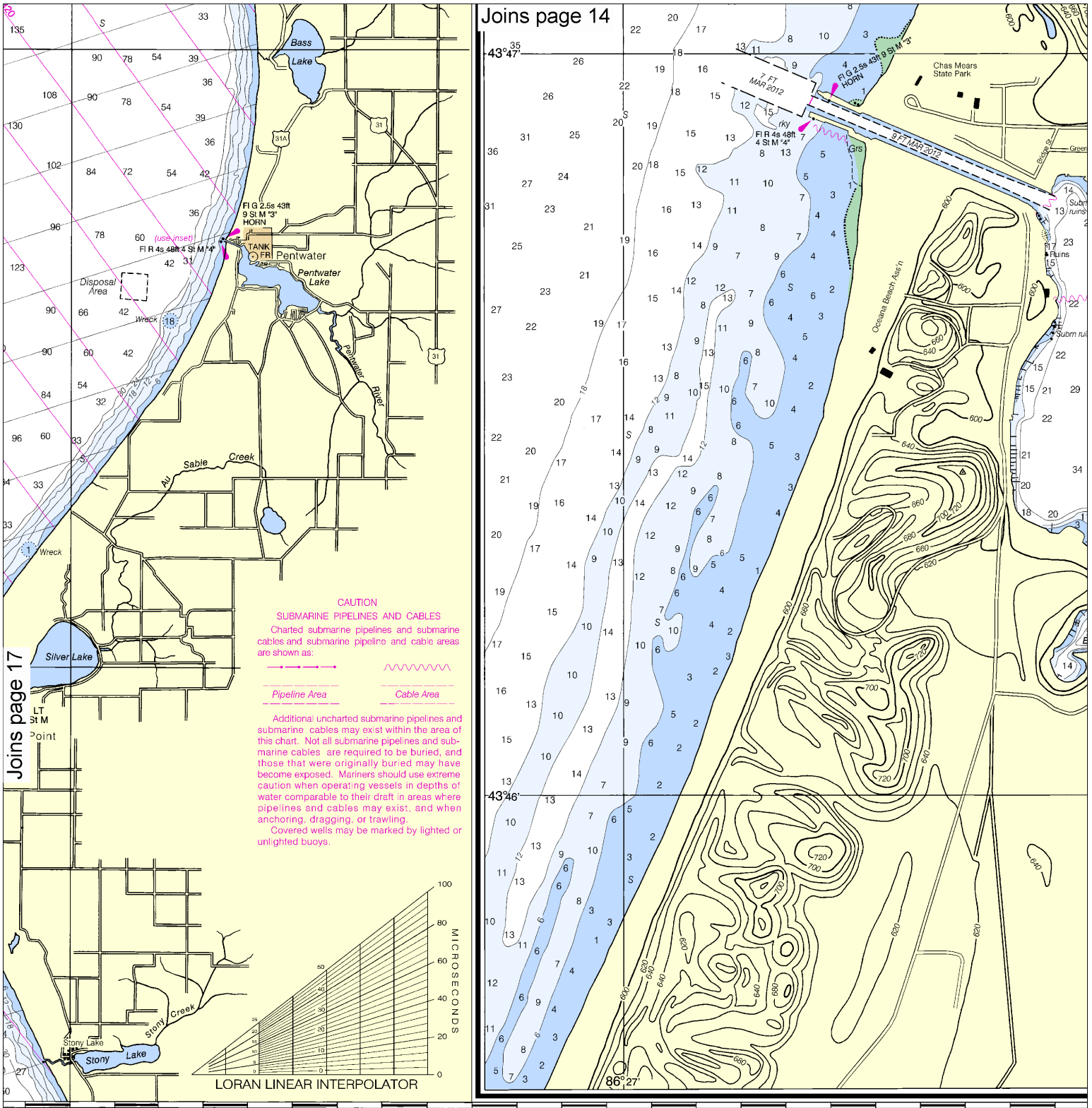
YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13



NGS IN FEET

Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST SURVEY



Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST SURVEY

FATHOMS 1 2
FEET 6 12
METERS 1 2 3 4

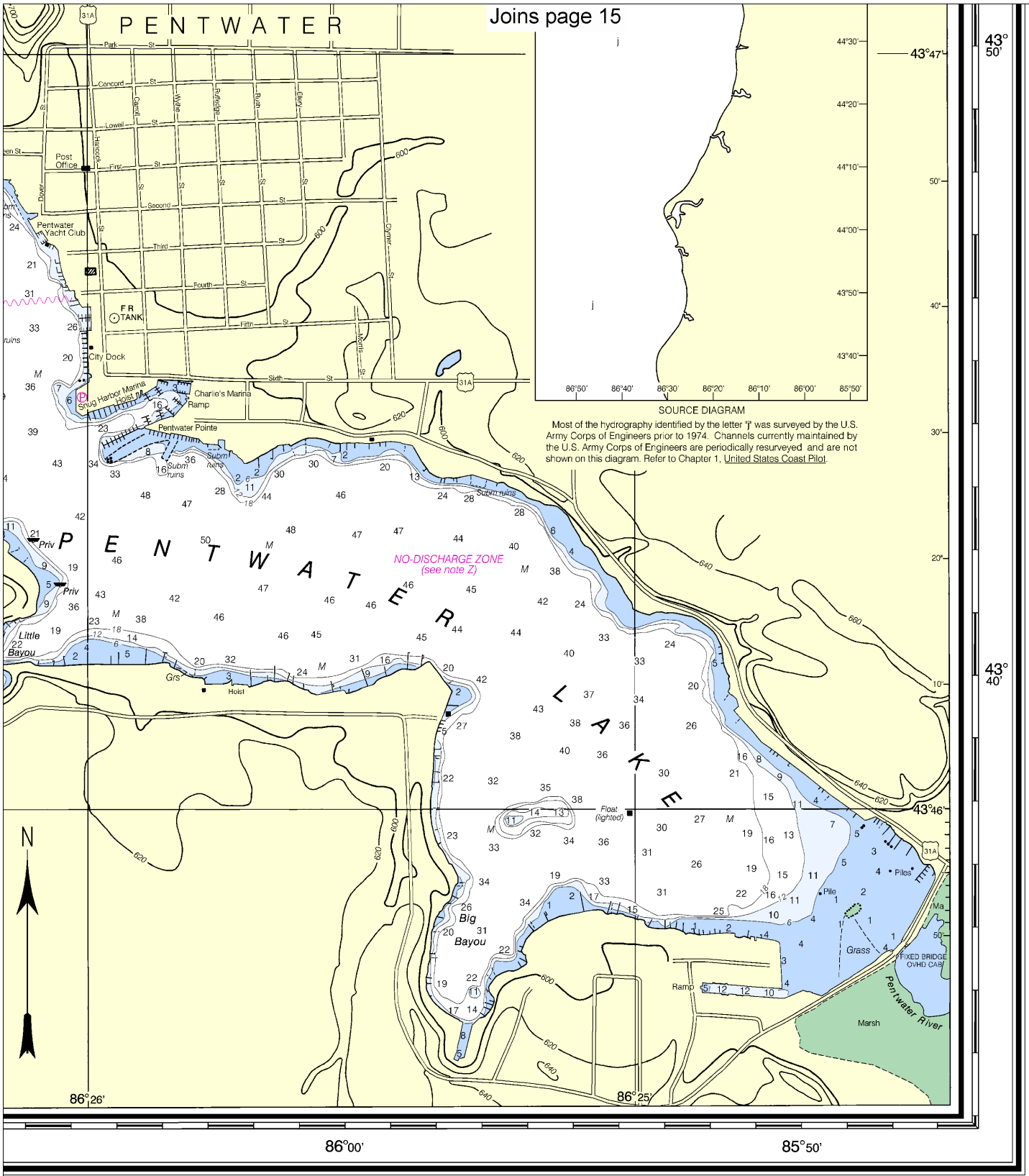
Note: Chart grid lines are aligned with true north.

Printed at reduced scale.

YARDS 5000 2500 0 5000 10000 15000

STATUTE MILES 0 1 2 3 4 5 6 7 8 9 10 11 12 13

See Note on page 5.



Stony Lake to Point Betsie

SOUNDINGS IN FEET - SCALE 1:120,000

14907

LORAN-C OVERPRINTED

ED. NO. 27

NSN 7642014010595

NGA REFERENCE NO. 14XCO14907

EMERGENCY INFORMATION

VHF Marine Radio channels for use on the waterways:

Channel 6 – Inter-ship safety communications.
Channel 9 – Communications between boats and ship-to-coast.
Channel 13 – Navigation purposes at bridges, locks, and harbors.
Channel 16 – Emergency, distress and safety calls to Coast Guard and others, and to initiate calls to other vessels. Contact the other vessel, agree to another channel, and then switch.
Channel 22A – Calls between the Coast Guard and the public. Severe weather warnings, hazards to navigation and safety warnings are broadcast here.
Channels 68, 69, 71, 72 and 78A – Recreational boat channels.

Getting and Giving Help — Signal other boaters using visual distress signals (flares, orange flag, lights, arm signals); whistles; horns; and on your VHF radio. You are required by law to help boaters in trouble. Respond to distress signals, but do not endanger yourself.

Distress Call Procedures

- Make sure radio is on.
- Select Channel 16.
- Press/Hold the transmit button.
- Clearly say: "MAYDAY, MAYDAY, MAYDAY."
- Also give: Vessel Name and/or Description; Position and/or Location; Nature of Emergency; Number of People on Board.
- Release transmit button.
- Wait for 10 seconds — If no response Repeat MAYDAY call.

HAVE ALL PERSONS PUT ON LIFE JACKETS!

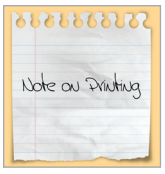
All Hazards NOAA Weather Radio NOAA's National Weather Service

NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week.
http://www.nws.noaa.gov/nwr/

Quick References

Nautical chart related products and information	—	**http://www.nauticalcharts.noaa.gov**
Online chart viewer	—	**http://www.nauticalcharts.noaa.gov/mcd/NOAAChartViewer.html**
Report a chart discrepancy	—	**http://ocsdata.ncd.noaa.gov/idrs/discrepancy.aspx**
Chart and chart related inquiries and comments	—	**http://ocsdata.ncd.noaa.gov/idrs/inquiry.aspx?frompage=ContactUs**
Chart updates (LNM and NM corrections)	—	**http://www.nauticalcharts.noaa.gov/mcd/updates/LNM_NM.html**
Coast Pilot online	—	**http://www.nauticalcharts.noaa.gov/nsd/cpdownload.htm**
Tides and Currents	—	**http://tidesandcurrents.noaa.gov**
Marine Forecasts	—	**http://www.nws.noaa.gov/om/marine/home.htm**
National Data Buoy Center	—	**http://www.ndbc.noaa.gov/**
NowCoast web portal for coastal conditions	—	**http://www.nowcoast.noaa.gov/**
National Weather Service	—	**http://www.weather.gov/**
National Hurrican Center	—	**http://www.nhc.noaa.gov/**
Pacific Tsunami Warning Center	—	**http://ptwc.weather.gov/**
Contact Us	—	**http://www.nauticalcharts.noaa.gov/staff/contact.htm**

twitter —— For the latest news from Coast Survey, follow **@nauticalcharts**



This Booklet chart has been designed for duplex printing (printed on front and back of one sheet). If a duplex option is not available on your printer, you may print each sheet and arrange them back-to-back to allow for the proper layout when viewing.

NOAA's Office of Coast Survey The Nation's Chartmaker